



Site Characterization and Monitoring Technologies Technology Profile

◆ Groundwater Sampling ◆

Technology Description

Groundwater sampling devices are an integral component of any field investigation, whether it be site screening or characterization or routine site groundwater monitoring. A variety of sampling devices has been developed and the devices vary widely in terms of design and performance features. General categories of samplers include grab sampling devices such as bailers, suction lift pumps, down-well centrifugal pumps, automated multi-level down-well sampling systems, and passive diffusional samplers. The type of sampler selected as well as well purging methods used in the collection process will influence the quality of the analytical results. For example, water samples that contain volatile organic compounds may be susceptible to volatilization losses during sample collection with samplers that generate considerable turbulence or that operate by means of suction lift principles. Materials used in the samplers may also interact with constituents in the water sample producing biased results. An ETV verification test was carried with a variety of groundwater sampling technologies in order to establish sampler performance parameters for volatile organic compounds. The participating vendors are listed in the table below.

Technology	Vendor	Contact	Address and Web Information
Multiprobe 100 (multi-level automated sampler)	Burge Environmental	Scott Burge 602-968-5141 burgenv@primenet.com	6100 S. Maple Ave, Suite 14 Tempe, AZ 85283 www.burgenv.com
SampleEase Model SP15T36 (bladder pump)	Clean Environment Equipment	Michael Breslin 510-891-0880 service@cee.com	1133 Seventh St. Oakland, CA 94607 www.cee.com
Micro-Flo Model 57400 (bladder pump)	GeoLog Inc.	Jim Mirand 800-645-7654 geologinc@aol.com	209 Starr Street Median, NY 14103 www.geologinc.com
Well Wizard Dedicated Sampling System (bladder pump)	QED Environmental	David Kaminski 800-624-2026 info@qedenv.com	6095 Jackson Road Ann Arbor, MI 48106 www.micropurge.com
Kabis Sampler Models I and II (discrete-level grab sampler)	Sibak Industries	Tom Kabis 800-794-6244 sibak@sibak.com	PO Box 86 Solana Beach, CA 92075 www.sibak.com
GORE-SORBER Water Quality Monitoring (passive diffusional sampler)	W. L. Gore and Associates	Ray Fenstermacher 410-392-7600 rfenster@wlgore.com	100 Chesapeake Blvd. Elkton, MD 21922-0010 www.gore.com



General Market Information

How much do sampling technologies VOC-contaminated water cost?

Capital costs for groundwater sampling systems range from \$1,700 to over \$5,000. Included in this figure are sampler accessories such as bladder pump pneumatic controllers where required. In some cases, teflon-lined polyethylene tubing is also required for sample collection, adding to total system costs. Sample analysis costs are not included in these estimates. One category of sampler evaluated (GORE-SORBER) is priced on a per unit basis with chemical analysis costs included in the purchase price.

Who would use or purchase such technologies?

Sampling systems for the collection of VOC-contaminated groundwater are used by environmental engineers, groundwater hydrologists, and state or federal regulators. They are used for screening during initial site characterization, as well as for long term routine monitoring at contaminated environmental sites.

What is the advantage of these technologies over conventional sample collection methods?

Conventional methods for groundwater collection often involve extensive well purging prior to sample collection with a bailer or other grab type sampler. Large volumes of undesirable purge water waste can be generated in this process. Alternative low purge volume, low flow sampling methods that incorporate bladder pump systems like those evaluated in this verification have also been developed. Other technologies evaluated in this test are designed for automatic (Multiprobe 100) or no-purge sample collection (Kabis Sampler), or are optimized for no-purge VOC screening applications (GORE-SORBER).

Verification Test Description

The performance of these six groundwater sampling or screening systems was verified using a combination of control and actual groundwater samples from a contaminated site. For control samples, a 100-foot, above-ground standpipe used to simulate a groundwater monitoring well. In a number of sampler trials, the standpipe was filled with water that included VOC contaminants at known concentration levels. Sampling systems undergoing performance verification were deployed in the standpipe while reference samples were simultaneously collected from adjacent sampling ports on the exterior of the pipe. Sampler performance factors that were evaluated included accuracy and precision for a suite of VOC compounds with varying volatility and water solubility. Control samples from the standpipe were supplemented with groundwater samples collected at a nearby VOC-contaminated site. Test descriptions and reports for all six technologies can be found at: <http://www.epa.gov/etv/verifrpt.htm#monitoring>.

Technology Performance Factors

Summary four-page verification statements as well complete reports are available at the ETV web site. The following is a list of technology performance factors that were evaluated and which are discussed in the comprehensive verification reports.

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| ✓ Relative Precision | ✓ Data Completeness |
| ✓ Relative Accuracy | ✓ Performance at Regulatory Limits |
| ✓ Comparability with a reference sample | ✓ Deployment Logistics |
| ✓ Ease of Use | ✓ Cost |

For More Information

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